

# Muscovite

# $\text{KAl}_2(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH}, \text{F})_2$

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . Crystals tabular to columnar  $\parallel [001]$ , striated  $\parallel \{001\}$ , pseudohexagonal or diamond-shaped, to 4.5 m and 77 t. As stellate aggregates, plumose, globular; scaly, granular, compact massive. *Twinning:* Composition plane  $\{001\}$ , twin axis  $[310]$ , forming six-pointed stars.

**Physical Properties:** *Cleavage:*  $\{001\}$  perfect; partings on  $\{110\}$ ,  $\{010\}$ . *Tenacity:* Laminae flexible and elastic; tough. *Hardness* = 2.5  $\parallel [001]$ ;  $4 \perp [001]$ . *D(meas.)* = 2.77–2.88 *D(calc.)* = 2.83

**Optical Properties:** Transparent to translucent. *Color:* Colorless, gray, brown, green, yellow, rose-red; commonly colorless in thin section, but may be pale yellow, green, red-brown. *Streak:* White. *Luster:* Vitreous to pearly or silky. *Optical Class:* Biaxial (-). *Pleochroism:* Weak when colored. *Orientation:*  $Z = b$ ;  $X \wedge c = 0^\circ\text{--}5^\circ$ ;  $Y \wedge a = 1^\circ\text{--}3^\circ$ . *Dispersion:*  $r > v$ , weak. *Absorption:* Faint;  $Y \simeq Z > X$ .  $\alpha = 1.552\text{--}1.576$   $\beta = 1.582\text{--}1.615$   $\gamma = 1.587\text{--}1.618$   $2V(\text{meas.}) = 30^\circ\text{--}47^\circ$

**Cell Data:** *Space Group:*  $C2/c$  ( $2M_1$ ).  $a = 5.19$   $b = 9.04$   $c = 20.08$   $\beta = 95^\circ 30'$   $Z = 4$

**X-ray Powder Pattern:** Synthetic;  $2M_1$ .

10.0 ( $> 100$ ), 3.351 ( $> 100$ ), 2.562 (90), 2.010 (75), 4.46 (65), 5.02 (55), 4.48 (55)

## Chemistry:

	(1)	(2)
SiO <sub>2</sub>	45.87	45.26
Al <sub>2</sub> O <sub>3</sub>	38.69	38.40
MgO	0.10	
Na <sub>2</sub> O	0.64	
K <sub>2</sub> O	10.08	11.82
H <sub>2</sub> O	4.67	4.52
Total	100.05	100.00

(1) Blue Mountain, Methuen Township, Canada. (2)  $\text{KAl}_2(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$ .

**Polymorphism & Series:**  $2M_1$ ,  $1M$ ,  $3A$  polytypes; interstratifies with vermiculite, paragonite, montmorillonite.

**Mineral Group:** Mica group.

**Occurrence:** A common rock-forming mineral, in phyllites, schists, and gneisses; in granites, granite pegmatites, and aplites. Formed from other minerals under hydrothermal conditions; may be detrital or authigenic.

**Association:** Quartz, plagioclase, potassic feldspar, biotite, tourmaline, topaz.

**Distribution:** Uncommon in euhedral crystals. From Slyudyanka, near Lake Baikal, Siberia, and at Mursinka, Ural Mountains, Russia. At Kammerfors, Kragerö, and Bamble, Norway. In the USA, at Mt. Mica, near Paris, Oxford Co., and elsewhere in Maine; large crystals from Pennsbury, Chester Co., Pennsylvania; at Amelia, Amelia Co., Virginia; fine crystals from near Shelby, Cleveland Co., North Carolina; in the Black Hills, in Pennington, Lawrence, and Custer Cos., South Dakota; and from the Harding mine, Dixon, Taos Co., New Mexico. In Methuen and Calvin Townships, Ontario, Canada. In Brazil, in Minas Gerais, at Urucum, from the Taquaral mine, Itinga, and in the José Pinto pegmatite, at Jaguaracú, near Coronel Fabriciano. Around Nellore, Andhra Pradesh, India, in commercial deposits which may contain huge crystals.

**Name:** From "Muscovy glass," for an occurrence in the old province of Muscovy, Russia.

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 614–621. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 3, sheet silicates, 11–30. (3) Yoder, H.S. and H.P. Eugster (1955) Synthetic and natural muscovites. *Geochim. Cosmochim. Acta*, 8, 225–280.

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